How the North Dakota Soil Irrigability Classifications were Developed

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Irrigation increases the productivity and consistency of crop production but not all soil is suitable for irrigation. The North Dakota Irrigation Guide was developed in the early 1980's as a joint project between many government agencies to classify soils for irrigation that every agency could use. This allowed them to provide consistent information to the public. In the Guide, soils were classified as irrigable, non-irrigable and conditional. Irrigable soil can be irrigated with suitable quality water under most circumstances. A soil classified as conditional can be irrigated but, depending on water quality and soil properties, may require a higher level of management. Non-irrigable soils should not be irrigated. However, sometimes non-irrigable soils are small inclusions in a larger tract of irrigable land and may be irrigated if managed very closely.

In 2003, the North Dakota Irrigation Guide was updated by the soil classifiers with the Natural Resource Conservation Service (NRCS) office in Bismarck. All soil series in North Dakota (approximately 350) were evaluated and separated into 29 irrigability classification groups. Groups numbered 1 through 7 are irrigable. Groups 8 through 22 are classified conditional and groups 23 through 29 are classified non-irrigable. Statewide, there are about 5.7 million acres classified with irrigable soils, about 16.5 million acres are non-irrigable and about 22 million acres have conditionally irrigable soils.

The irrigable soil classification is self-explanatory, however, there are a number of reasons why a soil may be classified as conditionally irrigable thus we chose to use three broad categories. Explanations for conditional and non-irrigable soils are shown in the table below.

Irrigation Group	Classification	Major Reason for Classification
8, 9, 10, 11, 21	Conditional	Poor internal drainage, moderately slow and slow permeability
12, 13, 14	Conditional	Restricted drainage, high permeability layer with restricted layer below
15, 16, 17, 18, 19, 20, 22	Conditional	Supplemental drainage required, poorly drained, high water table and salinity concerns
23	Non-irrigable	Slope too great
24	Non-irrigable	Salinity accumulation
25	Non-irrigable	Salinity hazard
26	Non-irrigable	Very shallow soil
27	Non-irrigable	Severe drainage problems
28	Non-irrigable	Frequently flooded
29	Non-irrigable	Extremely rocky and gravelly

Using Geographic Information System (GIS) software, these soil classifications were applied to the digitized soil survey information available from the NRCS. On the map, irrigable soils are colored green, conditional soils are colored amber (yellow) and non-irrigable soils are colored red. More detailed information about soil compatibility can be found in NDSU Extension bulletin EB-68 Compatibility of North Dakota Soils for Irrigation (available in November, 2012).